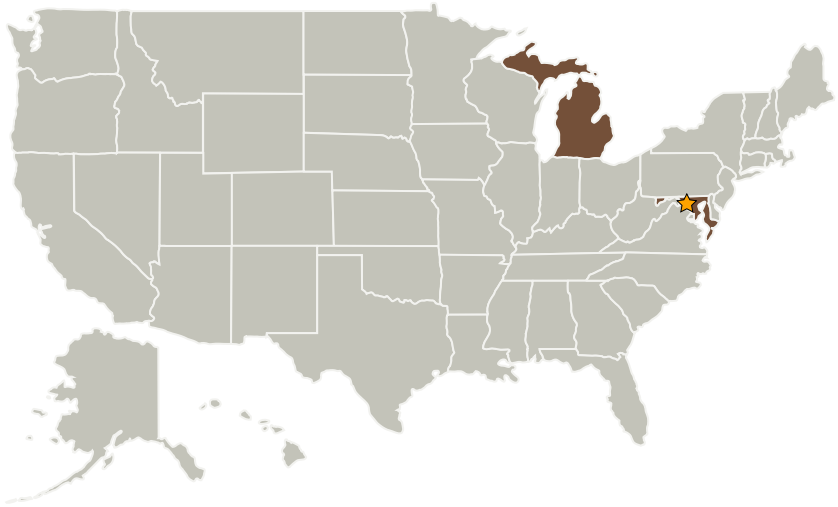
Electronic Correlated Noise Calibration Standard for Interferometric and Polarimetric Microwave Radiometers, Phase I

Completed Technology Project (2004 - 2004)

Project Introduction

A new type of calibration standard is proposed which produces a pair of microwave noise signals to aid in the characterization and calibration of correlating radiometers. The Correlated Noise Calibration Standard (CNCS) is able to generate pairs of broad bandwidth stochastic noise signals with a wide variety of statistical properties. The CNCS can be used with synthetic aperture interferometers to generate specific visibility functions. It can be used with fully polarimetric radiometers to generate specific 3rd and 4th Stokes parameters of brightness temperature. It can be used with spectrometers to generate specific power spectra and autocorrelations. It is also possible to combine these features and, for example, to generate the pair of signals that would be measured by a fully polarimetric, spectrally resolving, synthetic aperture radiometer at a particular pair of polarizations and antenna baselines for a specified scene over a specified frequency band. The CNCS covers those frequencies used for radiometric observations in the 1 to 40 GHz range. While intended for ground based characterization of radiometer systems, the technological approach is amenable to on-orbit calibration. Also, the CNCS can serve as an artificial radio frequency interference (RFI) generator for validating instrument performance in the presence of RFI.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Goddard Space Flight Center (GSFC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland
EMAG Technologies, Inc.	Supporting Organization	Industry	Ann Arbor, Michigan

Primary U.S. Work Locations	
Maryland	Michigan

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Kazem Sabet

Technology Areas

Primary:

- TX05 Communications, Navigation, and Orbital Debris Tracking and Characterization Systems
  - └ TX05.2 Radio Frequency
    - └ TX05.2.1 Spectrum-Efficiency